

Application No. 10/713,606
Confirmation No. 2509
Art Unit 1752, Examiner Walke
Docket No. CL-2229 US NA
September 14, 2007
Page No. 2 of 14

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Amendments

Please amend this application with respect to the matters set forth on separate pages below concerning the claims (beginning on page 3 of this paper):

In the Claims:

Please rewrite Claims 25~30, 32~39, 41 and 42. The requested amendments to Claims 25~30, 32~39, 41 and 42 are shown below on pages 3~11 of this paper in a marked-up version of that claim, as required by 37 CFR §1.121(c). Deletions are shown by strike-through, and additions are shown by underlining. A complete listing of all claims indicating the status thereof is also shown on pages 3~11.

Application No. 10/713,606
Confirmation No. 2509
Art Unit 1752, Examiner Walke
Docket No. CL-2229 US NA
September 14, 2007
Page No. 3 of 14

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Listing of Claims

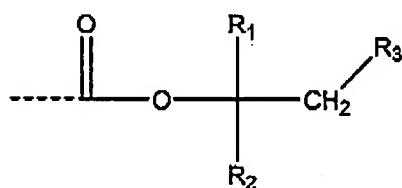
[including (i) amendments to Claims 25~30,
32~39, 41 and 42, and
(ii) status of all claims
(Claims 25~44 remain active)]

1~24. (cancelled).

25. (currently amended) In an electronic device that comprises a substrate having conductive properties, a process for fabricating a protective layer, comprising

(a) applying to the substrate a photopolymerizable protective layer composition to form a protective layer thereon, wherein the protective layer composition ~~comprises~~ consists essentially of a polymer comprising, as polymerized units, monomers of which at least 50 mole percent comprise a structure selected from the group consisting of:

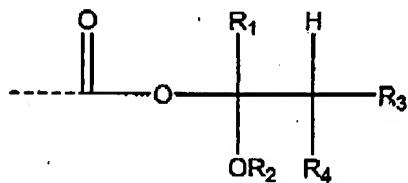
(I)



Application No. 10/713,606
Confirmation No. 2509
Art Unit 1752, Examiner Walke
Docket No. CL-2229 US NA
September 14, 2007
Page No. 4 of 14

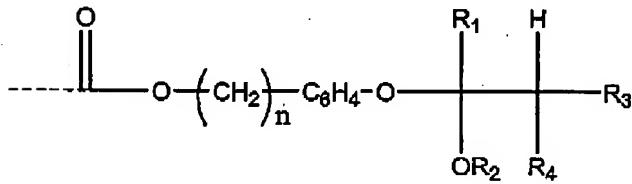
wherein R₁ is hydrogen or lower alkyl, R₂ is lower alkyl, and R₃ is hydrogen or lower alkyl; wherein lower alkyl includes alkyl groups having 1 to 6 linear or cyclic carbon atoms;

(II)



wherein R₁ is hydrogen or lower alkyl, R₂ is lower alkyl, and R₃ and R₄ are independently hydrogen or lower alkyl; wherein lower alkyl includes alkyl groups having 1 to 6 carbon atoms, and the joining of R₁ and R₂, or R₁ and either R₃ or R₄, or R₂ and either R₃ or R₄ to form a 5-, 6-, or 7-membered ring;

(III)



wherein R₁ is hydrogen or lower alkyl, R₂ is lower alkyl, and R₃ and R₄ are independently hydrogen or lower alkyl; wherein lower alkyl includes alkyl

Application No. 10/713,606
Confirmation No. 2509
Art Unit 1752, Examiner Walke
Docket No. CL-2229 US NA
September 14, 2007
Page No. 5 of 14

groups having 1 to 6 carbon atoms, and the joining of R₁ and R₂, or R₁ and either R₃ or R₄, or R₂ and either R₃ or R₄ to form a 5-, 6-, or 7-membered ring; and n is 0 to 4; and (IV) mixtures of (I), (II) and/or (III);

- (b) irradiating the protective layer through a mask;
- (c) heating the device;
- (d) contacting the protective layer with a developing solution to remove the portions of the protective layer composition exposed to radiation in step (b) and form a patterned protective layer;
- (e) irradiating the patterned protective layer; and
- (f) heating the device.

26. (currently amended) The process of Claim 25 wherein the protective layer composition comprises a polymer comprising es, as polymerized units, monomers of which at least 60 mole percent comprise a structure selected from the group consisting of (I), (II), (III) and (IV).

27. (currently amended) The process of Claim 25 wherein the protective layer composition comprises a polymer comprising es, as polymerized units, a monomer selected from the group consisting of 1-ethoxyethyl methacrylate (or acrylate), 1-butoxyethyl methacrylate (or acrylate), 1-ethoxy-1-propyl methacrylate (or acrylate), tetrahydropyranyl methacrylate (or acrylate), tetrahydropyranyl p-vinylbenzoate, 1-ethoxy-1-propyl p-vinylbenzoate, 4-(2-tetrahydropyranyloxy)benzyl methacrylate (or acrylate), 4-(1-butoxyethoxy)benzyl methacrylate (or acrylate); and mixtures thereof.

28. (currently amended) The process of Claim 25 wherein the protective layer composition comprises a polymer comprising es, as a polymerized unit, a monomer selected from the group consisting of t-butyl

Application No. 10/713,606
Confirmation No. 2509
Art Unit 1752, Examiner Walke
Docket No. CL-2229 US NA
September 14, 2007
Page No. 6 of 14

methacrylate (or acrylate); neopentyl methacrylate (or acrylate); 1-bicyclo{2,2,2}octyl methacrylate (or acrylate) and their derivatives; 1-bicyclo{2,2,1}heptyl methacrylate (or acrylate) and their derivatives; 1-bicyclo{2,1,1}hexyl methacrylate (or acrylate) and their derivatives; 1-bicyclo{1,1,1}pentyl methacrylate (or acrylate) and their derivatives; 1-adamantyl methacrylate (or acrylate) and their derivatives; and mixtures thereof.

29. (currently amended) The process of Claim 25 wherein the protective layer composition comprises a polymer comprising, as a polymerized unit, up to about 10 mole percent of a monomer selected from methyl methacrylate, methyl acrylate, methacrylic acid, and hydroxyl ethyl methacrylate; and mixtures thereof.

30. (currently amended) The process of Claim 25 wherein the protective layer composition comprises further consists essentially of 0.5-30 mole% of photoacid generator and 10-1000 ppm of photosensitizer.

31. (previously presented) The process of Claim 25 wherein the protective layer composition has a molecular weight in the range of about 7,000 to about 1,000,000.

32. (currently amended) The process of Claim 25 wherein the protective layer composition polymer comprises a copolymer.

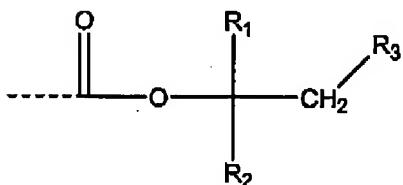
33. (currently amended) The process of Claim 25 wherein the protective layer composition comprises a polymer comprising, as a polymerized unit, a monomer having a hydrophilic group.

Application No. 10/713,606
Confirmation No. 2509
Art Unit 1752, Examiner Walke
Docket No. CL-2229 US NA
September 14, 2007
Page No. 7 of 14

34. (currently amended) A process for fabricating an electronic device that comprises a substrate having conductive properties, comprising

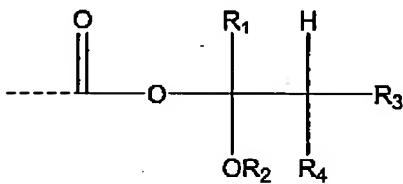
(a) applying to a first side of the substrate a photopolymerizable protective layer composition to form a protective layer thereon, wherein the protective layer composition comprises consists essentially of a polymer comprising, as polymerized units, monomers of which at least 50 mole percent comprise a structure selected from the group consisting of:

(I)



wherein R₁ is hydrogen or lower alkyl, R₂ is lower alkyl, and R₃ is hydrogen or lower alkyl; wherein lower alkyl includes alkyl groups having 1 to 6 linear or cyclic carbon atoms;

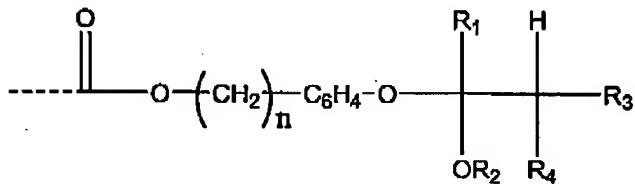
(II)



Application No. 10/713,606
Confirmation No. 2509
Art Unit 1752, Examiner Walke
Docket No. CL-2229 US NA
September 14, 2007
Page No. 8 of 14

wherein R₁ is hydrogen or lower alkyl, R₂ is lower alkyl, and R₃ and R₄ are independently hydrogen or lower alkyl; wherein lower alkyl includes alkyl groups having 1 to 6 carbon atoms, and the joining of R₁ and R₂, or R₁ and either R₃ or R₄, or R₂ and either R₃ or R₄ to form a 5-, 6-, or 7-membered ring;

(III)



wherein R₁ is hydrogen or lower alkyl, R₂ is lower alkyl, and R₃ and R₄ are independently hydrogen or lower alkyl; wherein lower alkyl includes alkyl groups having 1 to 6 carbon atoms, and the joining of R₁ and R₂, or R₁ and either R₃ or R₄, or R₂ and either R₃ or R₄ to form a 5-, 6-, or 7-membered ring; and n is 0 to 4; and (IV) mixtures of (I), (II) and/or (III);

- (b) irradiating the protective layer through a mask;
- (c) heating the device;
- (d) contacting the protective layer with a developing solution to remove the portions of the protective layer composition exposed to radiation in step (b) and form a patterned protective layer;
- (e) irradiating the patterned protective layer;
- (f) heating the device;
- (g) applying to the patterned protective layer a paste composition;

Application No. 10/713,606
Confirmation No. 2509
Art Unit 1752, Examiner Walke
Docket No. CL-2229 US NA
September 14, 2007
Page No. 9 of 14

(h) irradiating the device from a second side of the substrate to form a pattern in the paste composition; and

(i) contacting the paste composition and the patterned protective layer with a developing solution to remove (I) the portions of the paste composition not exposed to radiation in step (h), and (II) the patterned protective layer.

35. (currently amended) The process of Claim 34 wherein the protective layer composition comprises a polymer comprising ~~es~~, as polymerized units, monomers of which at least 60 mole percent comprise a structure selected from the group consisting of (I), (II), (III) and (IV).

36. (currently amended) The process of Claim 34 wherein the protective layer composition comprises a polymer comprising ~~es~~, as polymerized units, a monomer selected from the group consisting of 1-ethoxyethyl methacrylate (or acrylate), 1-butoxyethyl methacrylate (or acrylate), 1-ethoxy-1-propyl methacrylate (or acrylate), tetrahydropyranyl methacrylate (or acrylate), tetrahydropyranyl p-vinylbenzoate, 1-ethoxy-1-propyl p-vinylbenzoate, 4-(2-tetrahydropyranyloxy)benzyl methacrylate (or acrylate), 4-(1-butoxyethoxy)benzyl methacrylate (or acrylate); and mixtures thereof.

37. (currently amended) The process of Claim 34 wherein the protective layer composition comprises a polymer comprising ~~es~~, as a polymerized unit, a monomer selected from the group consisting of t-butyl methacrylate (or acrylate); neopentyl methacrylate (or acrylate); 1-bicyclo{2,2,2}octyl methacrylate (or acrylate) and their derivatives; 1-bicyclo{2,2,1}heptyl methacrylate (or acrylate) and their derivatives; 1-bicyclo{2,1,1}hexyl methacrylate (or acrylate) and their derivatives; 1-

Application No. 10/713,606
Confirmation No. 2509
Art Unit 1752, Examiner Walke
Docket No. CL-2229 US NA
September 14, 2007
Page No. 10 of 14

bicyclo{1,1,1}pentyl methacrylate (or acrylate) and their derivatives; 1-adamantyl methacrylate (or acrylate) and their derivatives; and mixtures thereof.

38. (currently amended) The process of Claim 34 wherein the protective layer composition comprises a polymer comprising, as a polymerized unit, up to about 10 mole percent of a monomer selected from methyl methacrylate, methyl acrylate, methacrylic acid, and hydroxyl ethyl methacrylate; and mixtures thereof.

39. (currently amended) The process of Claim 34 wherein the protective layer composition comprises further consists essentially of 0.5-30 mole% of photoacid generator and 10-1000 ppm of photosensitizer.

40. (previously presented) The process of Claim 34 wherein the protective layer composition has a molecular weight in the range of about 7,000 to about 1,000,000.

41. (currently amended) The process of Claim 34 wherein the protective layer composition polymer comprises a copolymer.

42. (currently amended) The process of Claim 34 wherein the protective layer composition comprises a polymer comprising, as a polymerized unit, a monomer having a hydrophilic group.

43. (previously presented) The process of Claim 34 wherein the paste composition comprises silver.

Application No. 10/713,606
Confirmation No. 2509
Art Unit 1752, Examiner Walke
Docket No. CL-2229 US NA
September 14, 2007
Page No. 11 of 14

44. (previously presented) The process of Claim 34 wherein the paste composition comprises carbon nanotubes.